

Ergonomics for Computer Users - Vision



What Is Computer Vision Syndrome?

Computer Vision Syndrome (CVS) is the complex of eye and vision-related problems associated with computer use. Symptoms of CVS can include eyestrain, headache, dry and irritated eyes, blurred vision, and tired eyes. Neck and back pain can also occur if posture is improper. As workers spend increasing amounts of time at computers, more computer vision problems are being noticed. In addition, the overall age of the workforce is increasing and our vision changes as we age (*presbyopia*, see below). It is estimated that more than 60 million Americans suffer from CVS.

What Factors Contribute to CVS?

- **Dry eyes** Studies indicate that people blink less than normally when reading and even less when computing. This is especially true of computer users who wear contact lenses. Less frequent blinking in the relatively dry climate of New Mexico contributes to dry and irritated eyes.
- **Monitor position** Monitors that are either too far away or poorly angled in relation to the location of the user's eyes can cause the user to assume awkward postures.
- **Tiny text** Characters that are too small can cause eyestrain and can affect the neck and back if the user is assuming an awkward posture in order to read the characters.
- **Monitor glare** Light that is reflected off the screen can degrade the image, causing eyestrain or visual discomfort.
- **Contrast & brightness** Poor contrast between the characters on the screen and the background on the monitor or between the brightness of the monitor and the brightness of the office space behind the monitor can cause eyestrain.
- **Monitor refresh rate** Too slow a refresh rate can cause the screen to appear to flicker, especially in your peripheral vision, which is more sensitive to flicker than your central field of vision. Even if the flicker is not perceptible, concern exists that it may increase the risk of vision difficulties.
- **Inadequate vision breaks** Constant work at the computer focusing your eyes at the same distance without taking appropriately timed vision breaks contributes to eyestrain.
- **Vision Correction** Multilenses such as bifocals can cause computer users to assume awkward postures in order to see the screen clearly. Out-of-date prescriptions can also contribute to eyestrain.
- **Presbyopia** Presbyopia is the normal age-related loss of a person's ability to focus sharply for near vision (i.e., inability to focus sharply on close objects). Research indicates presbyopic workers over 40 years old are at increased risk for symptoms associated with CVS.

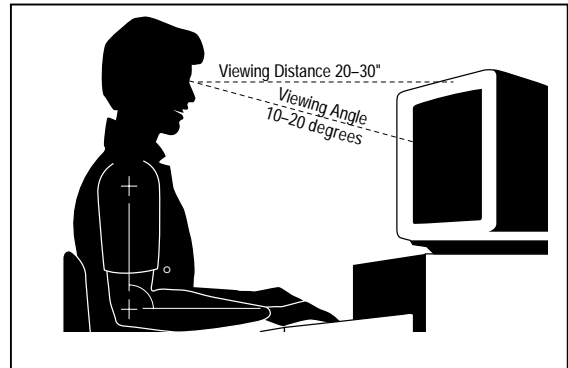
To see if glare is a problem, try holding a piece of cardboard over the top edge of the monitor to block the light from reaching the screen (or hold the cardboard along the side edge of the monitor if the light source is a window). See if the contrast and clarity of the images on the screen improve.

Most bifocal wearers will eventually need computer glasses for monitor work. This is because bifocals are designed for reading at a distance of about 16 in., whereas the monitor is usually 20–30 in. away. In addition, bifocals are often angled downward at a greater angle (25°) than the optimal viewing angle of the monitor. Consequently, to see the monitor clearly, many bifocal wearers lean forward in their chairs and tilt their heads back, increasing their risk of neck and back pain.

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How Can I Reduce My Risk of CVS?

- Blink frequently! Use moisturizing eye drops if your eyes begin to feel dry or gritty. NOTE: moisturizing eye drops do not contain vasoconstrictors and do not “get the red out.”
- Adjust the distance of the monitor from your eyes by holding your arm straight out with your palm facing out and position the monitor at the palm of your hand. Adjust the height of the monitor so that you are looking down at an angle of 10°–20° to the horizontal.
- Enlarge the size of the font or the scale of the document to a size that is comfortable to view.
- Reduce glare on the monitor by addressing the offending source(s) of light. Consider
 - adjusting lighting to avoid glare on screen and reducing overhead lighting where possible;
 - using variable lighting that is indirect or shielded where possible;
 - positioning your monitor at a 90° angle to office window(s), or closing the drapes or blinds; and
 - using an antiglare screen or monitor shield.
- Adjust the brightness of the monitor or of the room so that the screen and all objects within your field of view while computing have nearly equal brightness and any intense or uneven lighting in your field of vision is avoided. Try turning off unnecessary lights or having some light bulbs removed.
- Adjust the screen settings so that the contrast between the screen background and the characters is high (such as black characters on white background).



Distance and Angle from Monitor

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- Adjust the refresh rate of your monitor to at least 70 Hz. If you don't know how to do this, contact your computer support person.
- Use the 20/20/20 Rule! Every 20 minutes, take 20 seconds and look 20 feet away.
- Schedule regular eye exams, so prescription lenses can be updated as your vision changes. Consider computer glasses, especially if you wear bifocals. For information on obtaining computer glasses, go to http://www.esh.lanl.gov/~ergonomics/computer_glasses.html

Computer Vision Resources

- For information about the LANL ergonomics program or to schedule an ergonomic evaluation of your workstation, email ergonomics@lanl.gov or go to http://www.esh.lanl.gov/~ergonomics/eval_request.html
- For more information about CVS, go to <http://www.doctorergo.com> or <http://www.cvconsulting.com/>

If you think you are experiencing symptoms of a CVS, take action to reduce your risk! If necessary, call ESH-2 at 7-7839! Don't wait until the symptoms get worse!!